AQUA AIRS/AMSU/HSB

SCIENCE TEAM MEETING

PROJECT STATUS

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Agenda

- **Project Reports**
  - ***Milestones***
  - ***Operations***
  - ***AIRS Calibration Team Report***
- **AIRS IR Level 1B Report**
  - ***PGE Status***
  - ***Radiances***
  - ***Calibration Flags Usage***
  - ***Questions on Limits for Calibration Flags***

PROJECT REPORT

Milestones

Date	L+Mo	L+ Days	Stat	Event	Group
5/4/02		0	√	Launch	Ops
5/19/02		15	√	AIRS High Rate Starts;VIS, Microwave First Light	Ops
6/3/02		30	√	VIS/Microwave First Light JPL Review	Val
6/14/02		41	√	IR First Light	Ops/ACT
6/20/02		47	√	First Light JPL Review (L1A Focus)	
			√	Final Inputs by Evaluators for V2.5 (L1A Focus)	ACT/Val
			√	First Light Sanity Check	ACT/Val
			√	Release First Light Data to Science Team	SDPST
6/28/02		55	√	L2 MW software update	
			√	MW Only level 2 algorithm update	Rosenkranz
			√	MW Tuning coefficients, GCM-based	L McMillin
7/4/02		61	√	Science Team Review/L1A Focus Update	
			√	VIS, Microwave and IR First Light Data Review	ACT/Val/Sci
			√	Presentations by JPL and Science Team	ACT/Val/Sci
			√	v2.5 Build Complete at TDS (NOAA ASAP)	SDPST
7/12/02		69	√	Gain Tables Uploaded	ACT
7/13/02		70	√	Focus Day Acquisition	ACT/Ops
7/18/02		75	√	Focus Day JPL Review	
			√	Focus Day Sanity Check	ACT/Val
			√	Release Focus Day Data to Science Team	SDPST
7/25/02		82	√	Pre-90 Day Review	
			√	Special Test Data Review	ACT
			√	v2.5 (L1A Focus) Evaluation of SW Readiness	SDPST/ACT
			√	Pre Ship Review of v2.5	SDPST
			√	Science Team Data Review	Val/Sci
			√	L+90 Press Conference Discussion	Mgmt / Sci
			√	Special Validation Decision Point	Val
			√	Microwave Instrument Handover Review	Lambrightsen
			√	Post Launch Assessment Review (JPL)	Proj
			√	BAE SYSTEMS Performance Assessment Review	Proj
8/3/02	3.0	91	√	Aqua Transition to Operational Mode	
			√	Press Conference	Mgmt
			√	Final Gain Tables Uploaded	ACT
			√	PGS Calibration Tables Update at TDS (NOAA ASAP)	ACT
			√	L1A Focus PGS (V2.5) Delivery to DAAC/NOAA	SDPST
			In Process	Release Sample Data to DAAC	ACT/Val/SDPST
			√	Uninterupted AIRS Data Available to Science Team	Sci

LAUNCH TO L+90 MILESTONES NEARLY ALL COMPLETE

WE ARE ON TRACK

Public release of sample data nearly complete. Documentation being compiled. Release by 9/30/02

CURRENT MILESTONES TO L+9

Baseline Due Date						Est. Completion
10/3/02	5.0	152		L1B Focus Update		
				RTA Coefficients		10/3/2002
				V2.7 Build Complete at TDS (NOAA ASAP)		11/13/2002
				Reprocessing Begins on Data since stable		11/13/2002
				Regression coefficients, GCM based		11/30/2002
				Tuning coefficients, GCM based		11/30/2002
				Angle Adjustment coefficient if not nominal freq		11/30/2002
12/3/02	7.0	213		L1B Focus Pre Ship Review		1/14/2003
				v2.7 (L1B Focus) Evaluation of SW Readiness		1/14/2003
				Pre Ship Review of V2.7		1/14/2003
				Science Team Review of Operational Mode		1/7/2003
				Final Inputs by Evaluators for V3.0 (L2 Focus)		1/7/2003
				Final RTA coefficients		12/4/2003
				L1B Focus PGS (V2.7) Delivery to DAAC/NOAA		1/21/2003
1/2/03	8.0	243		L2 ancillary file update		2/11/2003
				Regression Coefficients		2/11/2003
				Tuning Coefficients		2/11/2003
				Angle Adjustment coefficient		2/11/2003
2/2/03	9.0	274		L1B Public at DAAC / L2 Update		2/20/2003
				V3.0 Build Compete at TDS (NOAA ASAP)		3/26/2003
				Reprocessing Begins on all Data to date		3/26/2003
				Public Release of L1B (V2.7) Data at the DAAC		2/20/2003
				Calibration Report Complete		2/20/2003
				Users Guide		2/20/2003

MILESTONES L+9 TO L+12

Baseline Due Date						Est. Completion
3/7/03	10.1	307		L2 Ship Review		4/9/2003
				L2 Focus Evaluation of SW Readiness		4/9/2003
				Pre Ship Review of V3.0		4/2/2002
				Science Team Review of L2 in Operational Mode		3/5/2003
				L2 Focus PGS (V3.0) Delivery to DAAC		4/9/2002
5/4/03	12.0	365		L2 Public at DAAC/ First Year Assessment		5/8/2002
				First Year Assessment		5/8/2002
				Public Release of L2 (V3.0) at the DAAC		5/8/2002
				Validation Report Complete		5/8/2002
				Users Guide		5/8/2002
Red: Action, Blue: Review, Green: Data Release						

PROJECT REPORT

Operations and Calibration

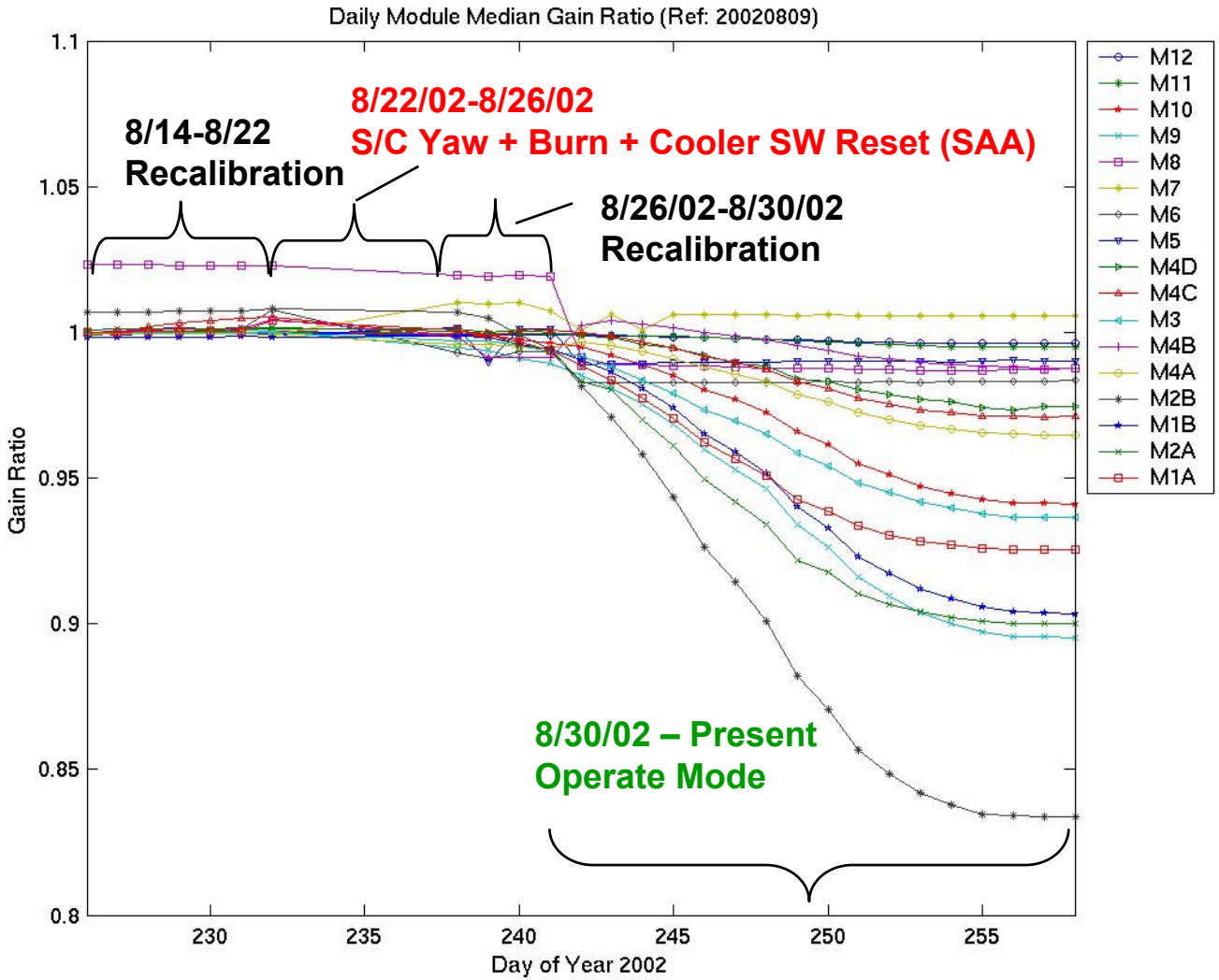
AIRS INSTRUMENT OPERATIONS TIMELINE

- Launch: 5/4/02
- First Light: 6/14/02
- Primary calibration sequences completed 7/19/02
  Radiation circumvention levels established
- Operate Mode: 7/20/02 – 7/29/02
- Defrost Cycle / Spacecraft Safing: 7/29/02-8/9/02
- Cooler SW Reset (WDT): 8/9/03-8/14/02
- Recalibration: 8/14/02-8/22/02
- Cooler SW Reset (SAA): 8/22/02-8/26/02
- Recalibration: 8/26/02-8/30/02
  Final gain tables loaded
- Operate Mode: 8/30/02 – Present

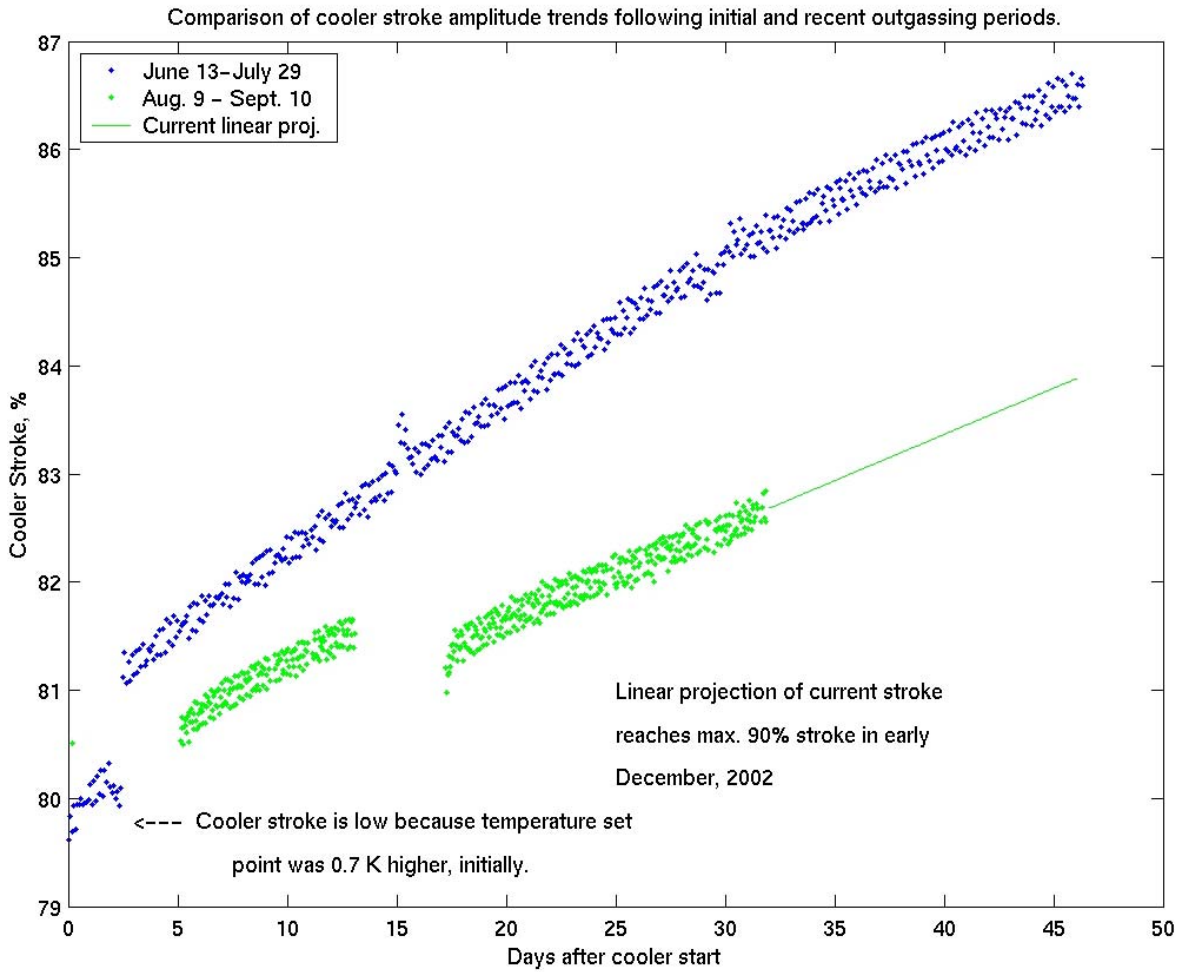
OPERATIONS STATUS

- **Instrument Activated Successfully. All systems operating normally**
- **All Calibration Sequences Complete**
- **Final Radiation Circumvention Levels and Gain Tables Loaded**
- **Optics and Cooler**
  - ***Optics clear after first defrost event. Accumulation started up again after 2nd cooler reset. Accumulation has ceased!***
  - ***Cooler clear, but accumulating. Expect de-icing***
- **Cooler Software Resets**
  - ***Patch in works to deactivate Watch Dog Timer (WDT)***
  - ***Plan in works for quick recovery from SAA events.***

ICE BUILDUP HISTORY ON OPTICS

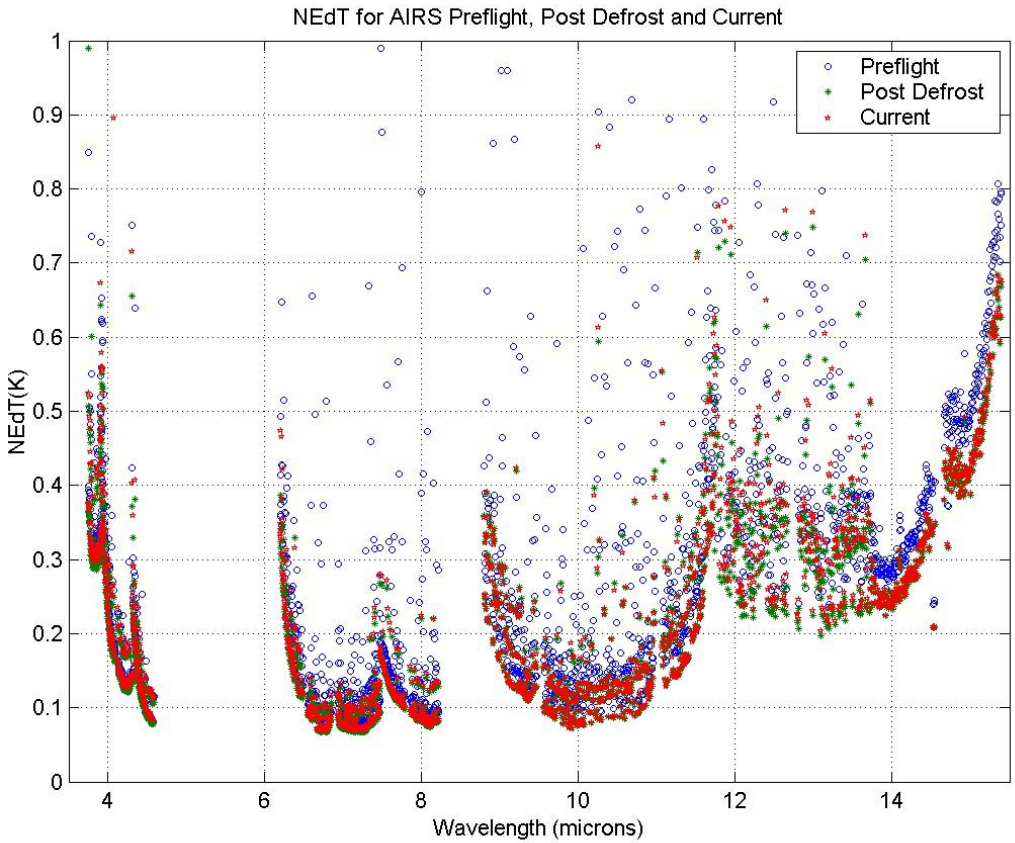


SINCE DECONTAMINATION, COOLER STROKE INCREASE HAS SLOWED



- **Rate of increase is 1/2 of growth rate before defrost.**
- **Maximum stroke will be reached in early December**

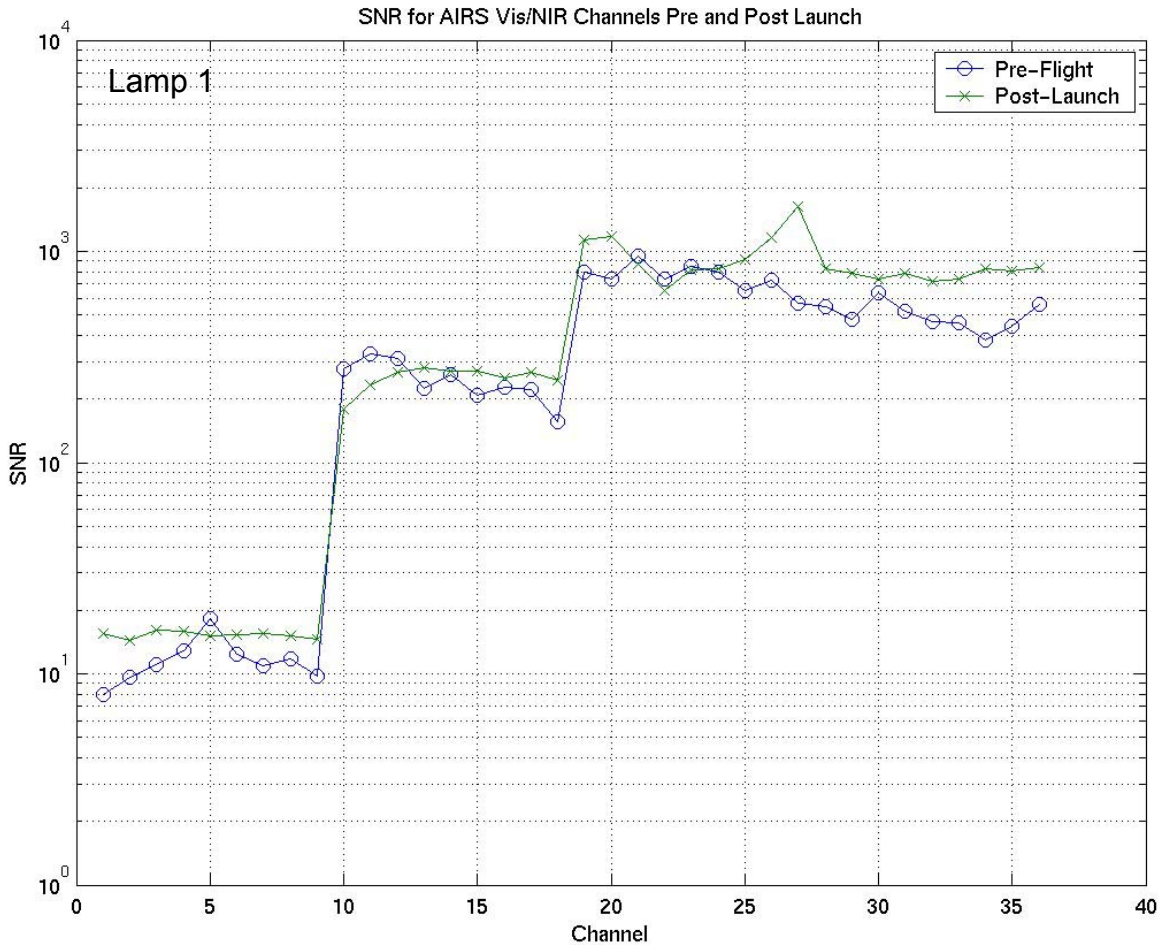
RADIOMETRIC: NEdTs STILL LOOK GOOD DESPITE ICING



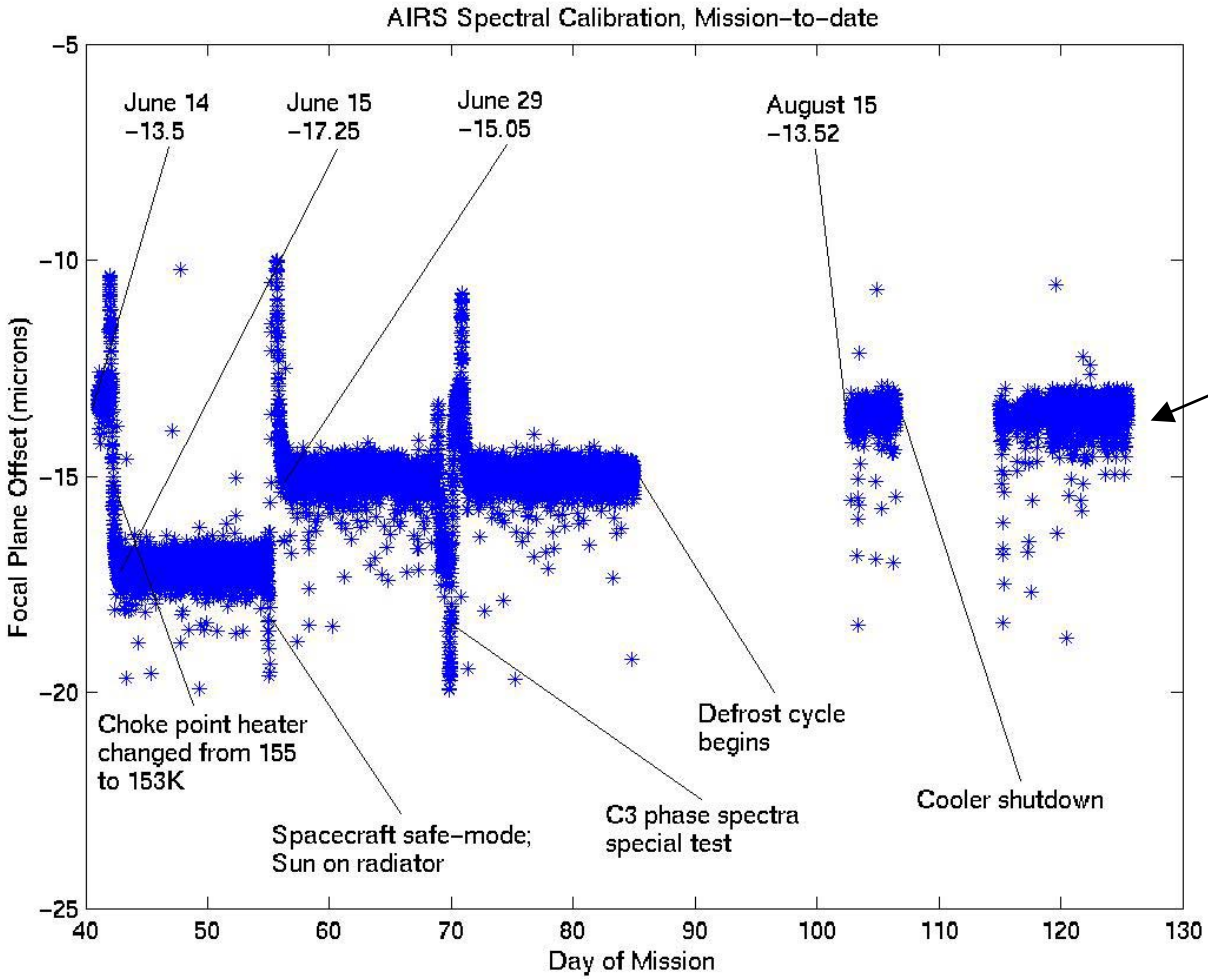
$$NEN_{scene} = Gain \times \sqrt{\left(N_{scene} / N_{obc} \right)\left(DN_{obc}^{\ 2} - DN_{sv}^{\ 2} \right) + DN_{sv}^{\ 2}}$$

DN's, and Gains available upon request

VIS SNRs LOOK GOOD PRE AND POST LAUNCH

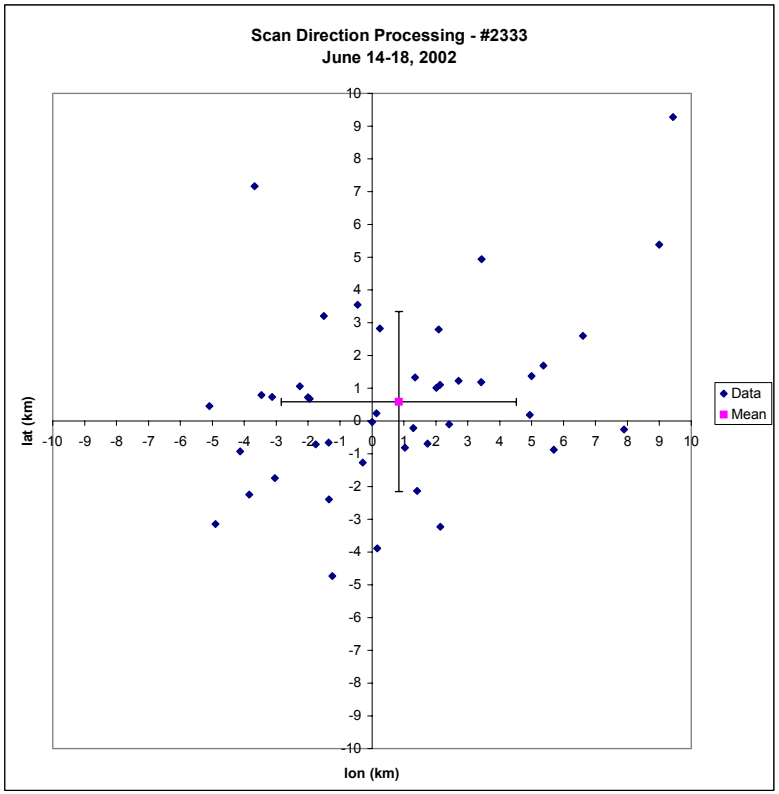


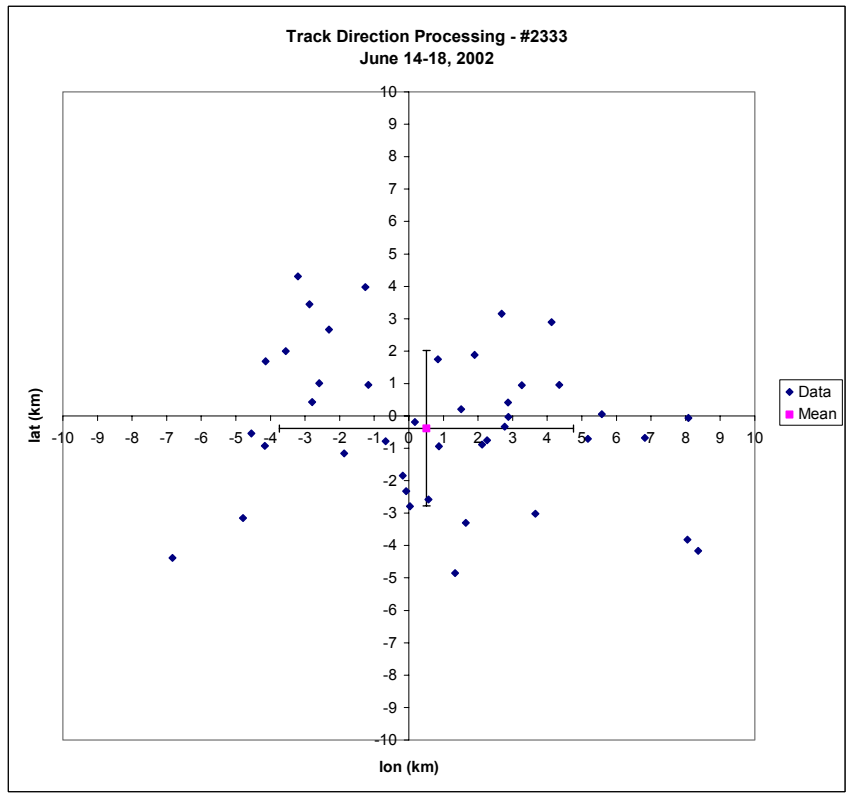
SPECTRAL: CENTROIDS TRACKED TO +/- 0.5 MICRONS (0.5% Width of SRF)



Current position is –13.5μm relative to June 2000 L. Strow Grating Model

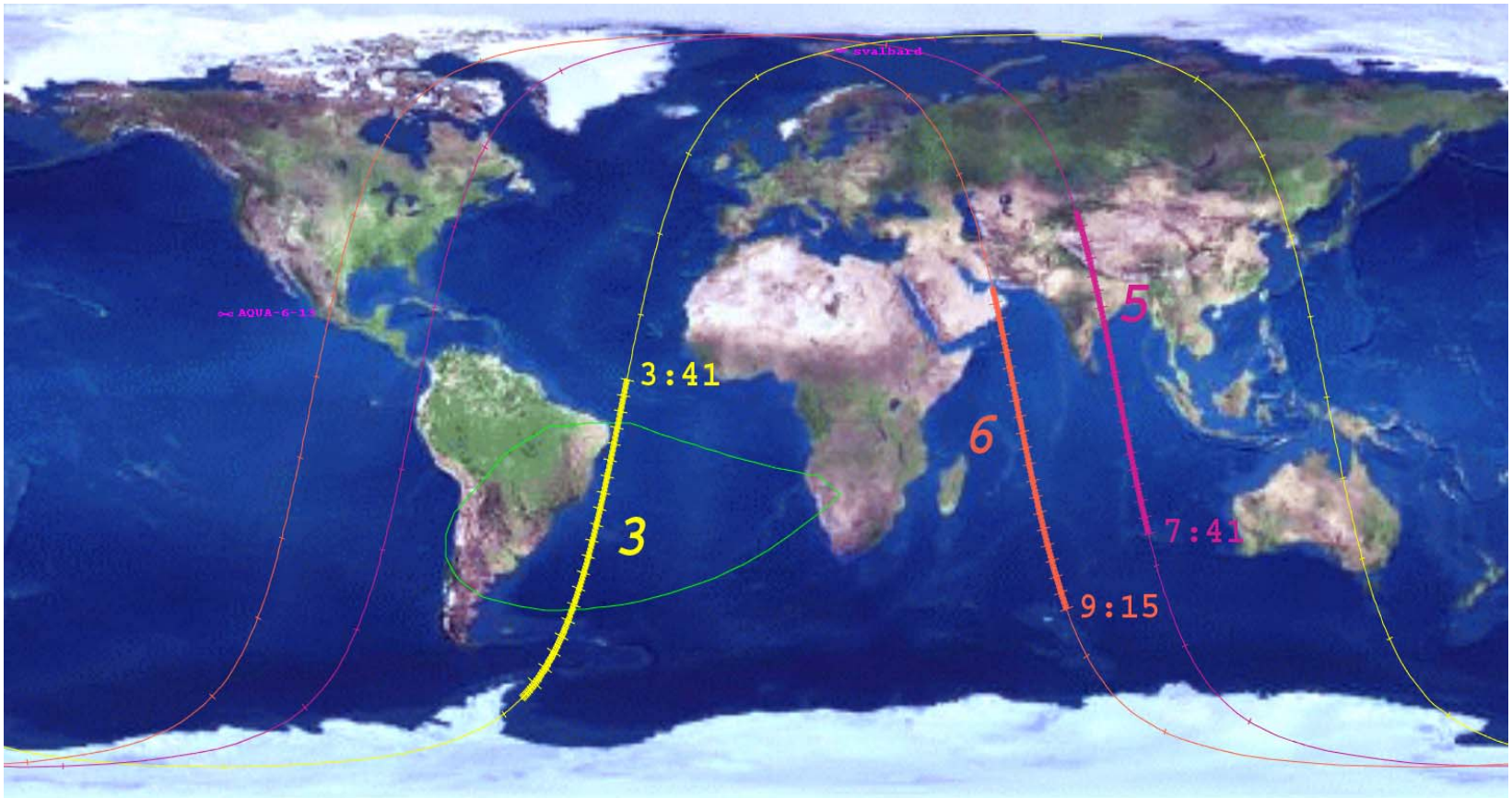
SPATIAL: BORESIGHT POSITION STILL REMAINS <+/- 1 KM FROM NOMINAL





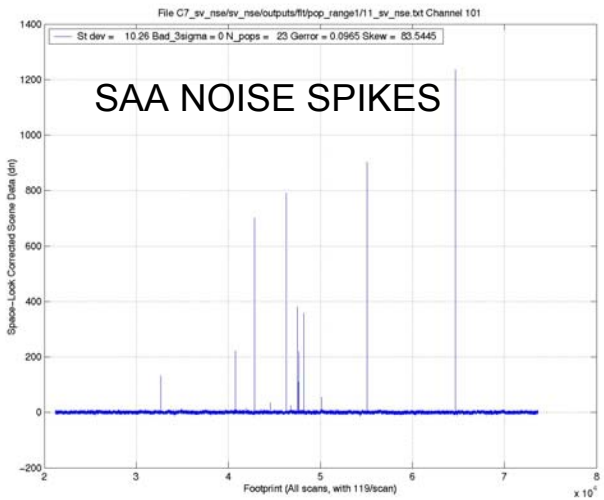
lat diff s	lon diff s		latdiff t	lon diff t			
0.5918	0.8431		-0.3804	0.5072	**mean**		
2.7515	3.6836		2.3950	4.2506	**std dev**		
0.4196	0.5617		0.3652	0.6482	**std dev mean**		

DATA ACQUIRED IN SAA TO MEASURE WORST CASE RADIATION EFFECTS

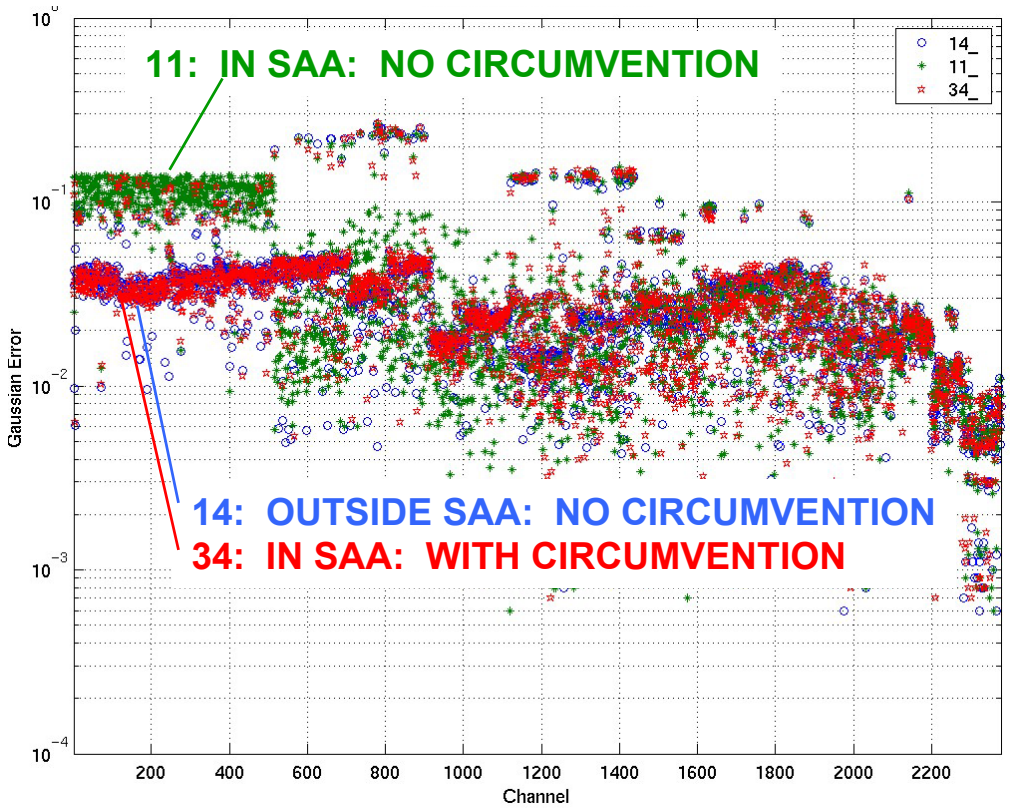


RADIATION CIRCUMVENTION PROCESSOR IS WORKING IN ORBIT

- Noise spikes observed in SAA
- Noise characterized in and out of SAA
- Circumvention levels set
- Noise re-measured in SAA to be at normal levels



NON-GAUSSIAN NOISE FACTOR VS CHANNEL FOR AIRS



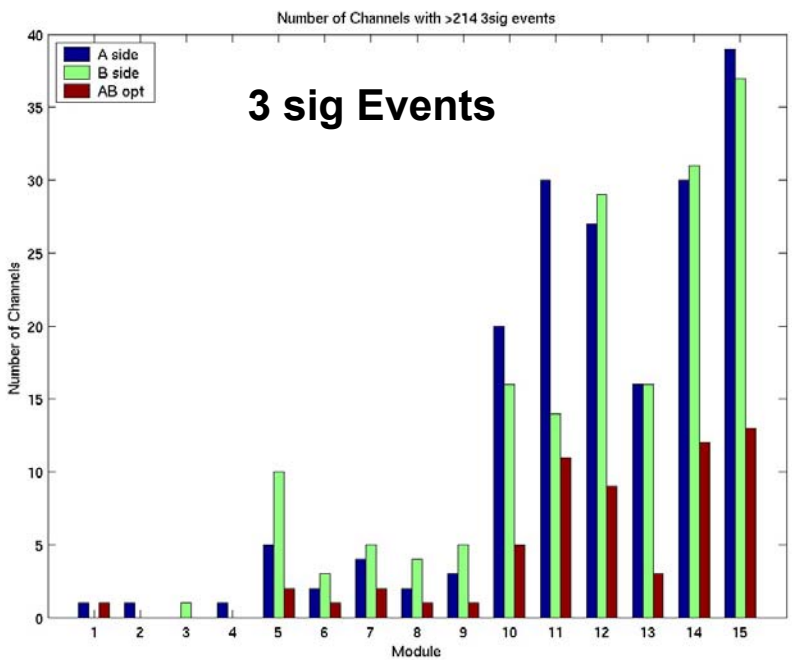
DETECTOR SELECTION IS COMPLETE

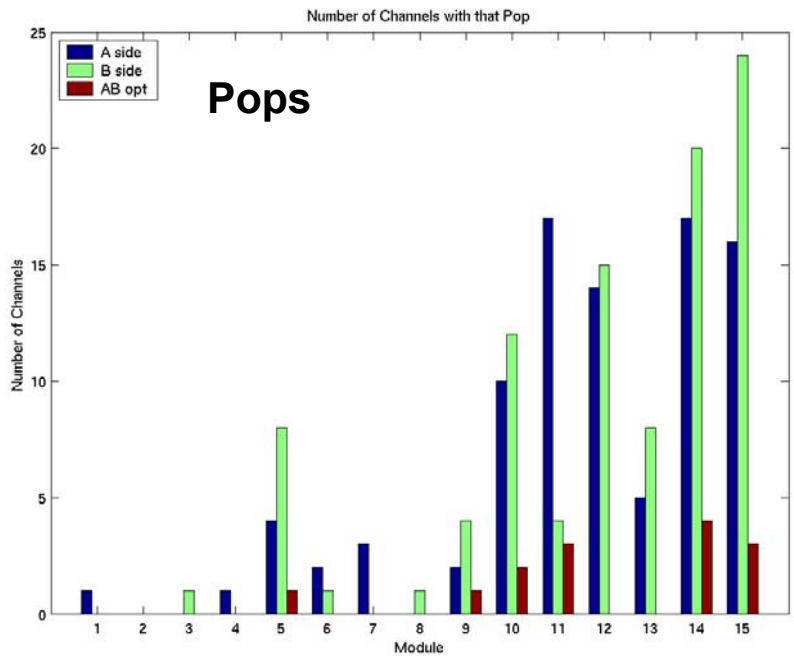
- AIRS has A and B row of detectors for each of the 2378 channel
- Select best detectors to use in Gain Tables (A, B or Both)
- Equal weighting when both are used
- Test Method
  - *Stare in spaceview for 440 scans and acquire 40K samples of noise data.*
  - *Perform statistical analysis on results*
- Test Criteria
  - *Noise level compared to other channels in the module*
  - *Number of 3 sigma events during test be less than 2x expected for a Gaussian Detector*
  - *No "pops" experienced during test*
- Results
  - *Test results are compared for A and B side detectors*
  - *Best combination of both is used to maximize instrument performance*
- Instrument gain tables are created and uploaded to AIRS

RESULTS SHOW GAIN TABLES WELL OPTIMIZED

Number of Channels that did not pass during 40,000 sample test:

	A	B	AB Opt
3sig Events:	181	171	61
Pops:	92	98	14
High Noise:			131
Total Now:			206





GAIN TABLE IS STABLE

Comparison of test results before and after cooler-only thermal cycle

2133	89.7%	Passed now and before cooler cycle
55	2.3%	Passed before and Failed now
39	1.6%	Failed before and Passed now
151	6.3%	Failed now and before cooler cycle
2378	100.0%	Total

Suggests a new gain table may NOT be needed every time we cycle cooler. This will minimize retest time after a defrost cycle.

CALIBRATION PROPERTIES HAS KEY PERFORMANCE INDICATORS

```
%AIRS Calibration Properties
%Output of mk_cal_props.m Filename: /netapp1/act/dat/ancillary/cal_props/v2.4.3/cal_props.txt
%Version: 2.4.3
%Input File Names:
%Spectral: /netapp1/insttest/pf_cal_coefs/spec_coefs/v3.3/spectral_coefs.txt
%Polarization: /netapp1/insttest/pf_cal_coefs/v1_coefs/pol_coefs.txt
%NEdTs: /netapp1/insttest/sts/C2_guard/nedts/outputs/flt/57_250_nedts.txt
%Noise Stats: /netapp1/insttest/sts/C7_sv_nse/sv_nse/outputs/flt/55_sv_nse.txt
%Pops: /netapp1/insttest/sts/C7_sv_nse/sv_nse/outputs/flt/55_sv_nse.txt
%Residuals: /netapp1/insttest/pf_cal_coefs/rad_coefs/with_pol_corr/ABsides40deg/resid_calc.txt
%Spatial: /netapp1/insttest/pf_cal_coefs/spa_coefs/56X.cij.d.dat
%AB_State: /netapp1/insttest/sts/C2_guard/ab_opt/outputs/flt/combined_tests/28ABstate.txt
%July 9, 2002 NeDTs and frequencies for AIRS.  Preliminary
%LMID PGEID     Vc       dV  Q_spec   nedt(K)  N>3sig  Pops  resid(K)     PF         Azcnt(deg)      Elcnt(deg)  AB_State
   0  2378  2664.612   2.13   1       0.650    77      0     -0.06    -0.06249       0.0230           0.1002        2
   1  2377  2663.507   2.13   1       0.468   157      0      0.06    -0.06251       0.0236           0.0945        0
   2  2376  2662.402   2.13   1       0.469   140      0      0.04    -0.06250       0.0230           0.0944        0
   3  2375  2661.299   2.12   1       1.362   105      0      0.11    -0.06218       0.0266           0.0850        1
```

File is available upon request